

**Amendment and Response**

Applicant: David Tyvoll et al.

Serial No.: 10/761,535

Filed: January 21, 2004

Docket No.: 200314393-1

Title: A METHOD OF ANALYZING BLOOD

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**IN THE CLAIMS**

Please cancel claims 4-5, 8-11, 14-19, and 29-31.

Please add claims 33-39.

Please amend claims 1, 6, 12, 20-25, 27-28, and 32 as follows:

1. (Currently Amended) A method of analyzing blood, comprising:  
delivering a blood sample including cells to a test chamber to directly expose the  
blood sample to both a sensor and an electrode arrangement within the test chamber~~device~~;  
applying a spatially varying electric field, via the electrode arrangement, to the blood  
sample within the test chamber to provide a ~~a~~ portion of the blood sample with a depleted cell  
concentration by electrically redistributing cells within the blood sample away from the  
sensor; and  
sensing, via the sensor within the test chamber, a property of the portion of the blood  
sample.
2. (Original) The method of claim 1, wherein the property of the portion of the blood  
sample is at least one of a presence and a concentration of a blood analyte.
3. (Original) The method of claim 1, wherein the depleted cell concentration in a  
portion of the blood sample corresponds to a plasma rich portion of the blood sample having  
a reduced red blood cell concentration, and wherein sensing the property of the blood sample  
comprises measuring the property in the plasma rich portion of the blood sample.
- 4-5. (Canceled)
6. (Currently Amended) The method of claim ~~[[4]]~~1, wherein sensing the property of the  
blood sample is performed ~~at at least one of~~ during application of the spatially varying  
electric field~~and after application of the spatially varying electric field~~.

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7. (Original) The method of claim 6, wherein sensing the property of the blood sample is also performed before application of the spatially varying electric field.

8-11. (Canceled)

12. (Currently Amended) A blood analyzer, comprising:

a fluid flow path including a test chamber configured to receive a blood sample that includes cells;

a sensor disposed in the test chamber ~~fluid flow path~~ and configured to measure a property of a portion of the blood sample; and

an electrode arrangement disposed in the test chamber and configured to generate a spatially varying electric field in the test chamber ~~in the fluid flow path~~ to reduce a cell concentration in the portion of the blood sample adjacent to the sensor by electrically distributing cells within the blood sample away from the sensor.

13. (Original) The blood analyzer of claim 12, wherein the property comprises at least one of a concentration and a presence of a blood analyte.

14-19. (Canceled)

20. (Currently Amended) The blood analyzer of claim 12, further comprising:

a meter ~~comprising~~ including a waveform generator configured for generating a signal that produces the spatially varying electric field and configured for controlling a measurement at the sensor; and

a test strip ~~comprising~~ including the fluid flow path, the sensor, and the electrode arrangement, the test strip being removably insertable into the meter for electrical communication with the meter to receive the signal and to perform the measurement of the property of the blood sample.

21. (Currently Amended) The blood analyzer of claim ~~[[14]]~~12, wherein the test chamber ~~comprises~~ includes a plurality of walls including a top wall, a bottom wall, and a pair of side

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walls, wherein the sensor is disposed on one of the plurality of walls that is at least one of opposite from and perpendicular to one of the plurality of walls on which the electrode arrangement is disposed.

22. (Currently Amended) The blood analyzer of claim ~~[[14]]~~12, wherein the sensor and the electrode arrangement are disposed on a same wall of a plurality of walls of the test chamber.

23. (Currently Amended) The blood analyzer of claim 22, wherein the sensor and the electrode arrangement define a single unit on ~~the~~a top wall of the test chamber, and the electrode arrangement is configured to impart a traveling wave in the spatially varying electric field to repel cells away from the sensor prior to or during sensing of the property of the blood sample.

24. (Currently Amended) The blood analyzer of claim 21, wherein the ~~test chamber defines a plurality of walls and~~ one of the plurality of walls that includes the sensor defines a surface, and wherein the sensor is located below the surface ~~of the one of the walls~~.

25. (Currently Amended) The blood analyzer of claim 12, wherein the sensor is at least one of an optical sensor mounted external to the fluid flow path and configured to emit light through the fluid flow path to measure the property of the blood sample ~~and~~or an electrochemical sensor mounted within the fluid flow path to measure the property of the blood sample.

26. (Original) The blood analyzer of claim 12, wherein the electrode arrangement is at least one of an electrode pair, a spiral electrode array, a linear electrode array, and a nested square electrode array.

27. (Currently Amended) The blood analyzer of claim ~~26~~12, wherein the electrode arrangement comprises a plurality of electrode elements in which at least one of the electrode elements includes a hybrid element which defines both the sensor and a field electrode

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configured to apply the spatially varying electric field in cooperation with the other electrode elements.

28. (Currently Amended) The blood analyzer of claim 27, further comprising system electronics configured ~~to for~~ first applying the spatially varying electric field as a traveling wave to repel cells from both the field electrode and the sensor of the electrode arrangement in the relative absence of the cells from the sensor and ~~to for~~ later operating the sensor of the electrode arrangement to measure the property of the blood sample ~~to repel cells from the electrode arrangement in the relative absence of the cells from the sensor~~.

29-31. (Original)

32. (Currently Amended) A method of testing a property of blood in a test strip of a self-monitoring glucose meter, comprising:

- obtaining a blood sample within ~~[[a]]the test strip and external to a test chamber of the test strip of a self-monitoring glucose meter, the test strip including a test chamber;~~
- applying a first spatially varying electric field to the blood sample within the test strip and external to the test chamber, to separate and exclude a first plurality of red blood cells from the blood sample to produce a modified blood sample;
- delivering the modified blood sample into ~~a~~ the test chamber; and
- applying a second spatially varying electric field to the modified blood sample within the test chamber to produce a relatively lower concentration of red blood cells adjacent a sensor within the test chamber; ~~to enhance measurement of glucose~~

measuring a property of ~~within~~ the modified blood sample at the sensor within the test chamber.

33. (New) A blood analyzer, comprising:

- a fluid flow path for receiving a blood sample;
- a sensor disposed in the fluid flow path and configured to measure a property of a portion of the blood sample; and

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an electrode arrangement disposed in the fluid flow path and configured to generate a spatially varying electric field in the fluid flow path to reduce a cell concentration in the portion of the blood sample, wherein the electrode arrangement is at least one of an electrode pair, a spiral electrode array, a linear electrode array, or a nested square electrode array, and wherein the electrode arrangement comprises a plurality of electrode elements in which at least one of the electrode elements includes a hybrid element which defines both the sensor and a field electrode configured to apply the spatially varying electric field in cooperation with the other electrode elements.

34. (New) A blood analyzer, comprising:

a fluid flow path including a test chamber and a conduit portion configured to receive a blood sample;

an electrode arrangement disposed in the conduit portion and configured to generate a spatially varying electric field to reduce a cell concentration in a portion of the blood sample within the conduit portion before the blood sample reaches the test chamber; and

a sensor disposed in the test chamber and configured to measure a property of the portion of the blood sample.

35. (New) The blood analyzer of claim 34, wherein the reduced concentration of cells corresponds to a depleted cell concentration in a first portion of the blood sample and an enriched concentration of cells in a second portion of the blood sample.

36. (New) The blood analyzer of claim 35, wherein the fluid flow path includes a collecting chamber, separate from the test chamber, configured to collect the second portion of the blood sample.

37. (New) The blood analyzer of claim 34, wherein the conduit portion is configured to conduct the blood sample in a first direction, and wherein the electrode arrangement is configured to deflect cells in the blood sample in a second direction transverse to the first direction.

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38. (New) The blood analyzer of claim 37, wherein the electrode arrangement includes a first portion configured to generate a traveling wave in the spatially varying electric field to deflect cells in the second direction away from the test chamber and a second portion, separate from the first portion, configured to generate a high field region for deflecting cells in the second direction away from the test chamber.

39. (New) The blood analyzer of claim 38, wherein the first portion of the electrode arrangement includes a linear electrode array disposed within the conduit portion of the fluid flow path for generating the traveling wave, and

wherein the second portion of the electrode arrangement includes a gate electrode array disposed at a junction of the conduit portion and the test chamber and configured to generate the high field region.